Designing Innovation workshop : i.school UTokyo

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Since September 2009, the author has been carrying out innovation education, for the purpose of developing the ability to produce innovation, at i.school UTokyo, innovation school at the University Tokyo (executive director Hideyuki Horii, director Yukinobu Yokota). Thinking which produces new ideas is the abduction (or abductive reasoning) and thinking which produces new ways of problem solving is the same as that which produces new services and business models. The workshop process which has been established through i.school activities is also effective in proposing novel and effective ways of solving social problems. In this article, I will present the activities of the i.school and the workshop process which aims to produce innovation.

1. i.school background

Japan's economy has been on the decline since 1990 or so, long unable to escape deflation since the collapse of the bubble economy. This has been called the lost decade; in the 2010 GDP announced on February 14th, 2011, and reflecting the 2008 Lehman crash, on a nominal basis with price fluctuations accounted for, China had passed Japan to become second in the world. Subsequently, under the influence of the Great East Japan Earthquake on March 11th, 2011, and the strong yen, Japan recorded a trade deficit for the first time in 31 years, and the need for a third miracle became clear to everyone.

Following the Meiji Restoration with its slogan of "rich country, strong army" and the high economic growth which established Japan as a trading country after World War II, what should Japan aim for as its third miracle? The second great economic nation in the world is now a thing of the past. It's difficult to compete directly with large countries such as the United States and China. Japan needs a national strategy and direction suited to its own qualities. There is no argument over "innovation" as the keyword. Everyone in the world has made this clear. The issues are what kind of innovation Japan should attempt, and how it can build dominance

thereupon.

The definition of “innovation” in the 6th edition Kojien Dictionary is “(meaning innovation, renewal, renovation) not only a renewal of production technology, but a concept including the introduction of a new product, the opening of a new market or new resources, the establishment of a new management organization.” However, the exegesis includes “in this country, it is used in the limited meaning of technological innovation.” This is thought to be where the heart of the problem lies.

Schumpeter, who introduced the concept of innovation, emphasized that innovation can exist without new inventions. However, because Japan is skilled at technological development, cases where innovation is used only in the narrow meaning of technological innovation are frequent. In the fierce competition for technological development, due to concentrating too much on the achievement of technological goals, the means became the end. Although the value of creation was the original goal, the goal became the technological development which was the means to creation of value.

In that case, what direction should we face in order to return to the original meaning of innovation? It is essential to alter our technocentrism and focus on daily life. Understanding what people subconsciously search for in daily life and providing things and services which will make them think “Oh, this is what I was looking for,” is now the task.

To deal with this, the attitude of “human-centered innovation” is important. Human-centered innovation, through close examination of human lives and senses of values and creating new products, services, business models, and social systems, introduces changes in human lifestyles and values.

Creating many new high-quality things and ideas based on Japanese sensibilities, that is “seeking typical Japan-ness,” is the strategy Japan should take. On this point, it is a great misunderstanding that Japanese lack originality, and as the much-lauded “Cool Japan” et al. symbolizes, Japan is well possessed of the capacity for human-centered innovation.

In order to create human-centered innovation, it is important to be absorbed in the situation focused upon and to completely become the people appearing there. President Ishii Junzo of the University of Marketing and Distribution Sciences writes in Business Insight that the knowledge working in the creative moment when a new business model is born is called business

insight, and that it requires the mechanism of living inside (internalizing) the object.

For example, the place where Nakauchi Isao opened his first Daiei store outside Senbayashi Station on the Keihan Railway (in Osaka) was a narrow space where no store had been able to flourish. He aimed to sell medicines cheaply, but didn't do well and, based on customer suggestions, offered penny candies. At the time penny candies were sold by weight, and customers tried them out before deciding to buy. Because customers were concentrated in the late evening, they were kept waiting and it was inefficient. Nakauchi used his free time to put candies into semitransparent plastic bags, prepared them and sold them, coming up with the ideas of "prepackaged" and "self-service." Further, he put up signs saying "If you don't like the taste, bring back the bag and the receipt. Your money will be completely refunded." This style won the hearts of Osaka's consumers, and earned great success. This kind of insight, Ishii declares, comes from the mechanism of living in the object.

Living in the object is what the Japanese are good at. In Ideas of English, through an analysis of the process of translating English and Japanese, emeritus professor Anzai Tetsuo of Sophia University vividly details the fundamental ideas and awareness patterns of Japanese and English. English has a strong tendency to focus on the agency of "concrete things" in order to grasp a situation, causally analyzing and conceptualizing them. Japanese, on the other hand, grasps a situation as an "abstract thing," focusing closely on the connections of that "thing" with humans from the human point of view. Japanese expressions are decisively subjective; the listener constantly empathizes with the speaker, and through reexperiencing the situation while listening, first senses the content of the words. Communication in Japanese is based on this empathic style, buried in the situation. Typical of this Japanese ideation is surely that Japanese easily live in their objects, the basis for being good at creating human-centered innovation.

Japanese, being good at living in their objects, should be creating more innovations. But unfortunately, Japan seems to possess a mechanism for nipping innovation in the bud. "Somebody's already tried that," "Nobody's ever done that," "We don't do things that way here," are words which kill ideas. Customs, stereotype, loss of confidence and cowardice are known to

obstruct original creativity. It is essential to set up an environment which fosters innovation.

The world is starting to become aware of the importance of setting up environments which foster innovation and of building up training for creating innovation. IDEO, the American design consulting company, continues to draw world attention by developing functional and playful products. The secrets to their success include innovation being born from human observation, building a hot team, extreme brainstorming skills, rapid prototype production, a "greenhouse"-like office, and providing a fun experience.

Programs for innovation education are being developed around the world: as well as the d.school at Stanford University and Illinois Institute of Technology's Institute of Design in the United States, there is, the Innovation Design Engineering program at the United Kingdom's Royal College of Art (RCA), Finland's Aalto University's Institute of Design, the Industrial Design program at KAIST in the Republic of Korea, and so on. In the August 1st, 2005 issue of the American magazine Businessweek, programs like these were introduced in a special report entitled "Tomorrow's B-School? It Might Be a D-School." No major changes have occurred in this trend, which indeed seems to be growing ever stronger.

To advance "the search for Japan-ness" and receive the world's praise for high-quality objects and ideas from Japan, there is a need to set up an environment in Japanese society that fosters innovation. This is the intention with which the i.school was set up as an educational program of Tokyo University's Center for Knowledge Structuring in September, 2009. In order to turn social problems into opportunities for innovation, it promotes the structuring of knowledge for nurturing new leadership and creative thought. We hope that the capacity for innovation cultivated here will be put to use in various fields, eventually producing new ideas, new products, new business models, and new social systems, revolutionizing Japanese society.

According to The Art of Innovation, by IDEO's general manager Tom Kelley, everyone has a creative part, and stimulating social mores will help make it flower. Everyone has fun and feels happy when exercising their creativity. A society with an environment which fosters innovation is a happy society whose members are all having fun. We should aim to be a country which continually produces innovative and praiseworthy things and ideas.

2. Summary of i.school

(1) What is the i.school?

The i.school's educational program is composed of workshops for 20-30 participants. Roughly six workshops are held a year, including intensive workshops held during summer vacations etc. and termtime workshops held every week for ten weeks.

Each workshop has a different theme and method, but common to each is a focus on group work in four or five groups. Characteristic of i.school is that it does not include product design in its themes, but takes up a balance including service design and social corporate design.

One team is about six people. Would-be participants can apply from all sectors of Tokyo University. Graduate students make up the bulk of the participants, but undergraduates who are particularly determined to participate may also do so. Participants are chosen by written application and interview. Neither credits nor degrees are given. Participants' only purpose is self-improvement. Therefore, very motivated students take part. Team formation is done so as to have a diversity of specialty and gender in each team. Diversity is the fount of creativity.

One or two professionals dispatched by the i.school's partner businesses also join each team. As the students inevitably lack knowledge of actual society, the presence of the working people is important for maintaining reality and sociality as well. They also stimulate one another to fresh ideas.

The i.school has two goals. These are 1) when presented with a task requiring creativity, to learn to construct the most appropriate workshop process, and further 2) to build up successful experience of creating objects and ideas which produce new impacts.

The output, new products, services, or business models, itself is also important, but more important than that is goal number 1). In response to a given task, being able to think of how to build a team, what work to do in what order and so on should raise the probability of innovation. After all, we can do no more than raise the probability, but the point is to learn ways to do that.

As in the column on "The mindset which leads to ideas," through building up experiences where creating new ideas is fun, we are able to

connect the act of creating new ideas with positive sensations. This is one of the factors in nurturing people who can create innovation. It is the reason we have goal 2).

There is one more necessary factor for human resources capable of creating innovation. That is the "feeling" of wanting to make a better society, or thinking that certain objects must be a certain way. This could also be called the motive power of innovation. The motive power of Steve Jobs' innovations is known to have been his strong "feelings," based on Zen and calligraphy which influenced him strongly. Is it possible to plant similar "feelings" in students? It is difficult to teach "feeling." At the i.school, many workshop themes involve solving social problems. Through the workshop process of researching social issues and exploring their solutions, we hope to cultivate the "feelings" that will lead to innovation.

The i.school maintains the following five principles.

1) Cultivation of new leadership

A new leader is one who, with a broad perspective on the whole of business and society, can realize the achievement of their goals. In short, new leaders are called upon to have innovative ideas and to work with stakeholders at all levels to realize revolution.

2) Human-centered innovation

All technologies, systems, and cultures created by the human race have developed in the pursuit of freedom, equality, and above all happiness. In order to realize sustainable happiness, what is called for is creativity rooted in an understanding of humanity based on examination of daily life and values.

3) Structured knowledge for creative thought

Through the use of the tools provided by the Tokyo University Knowledge Structuring Center, use can be made of the discovery of important facts and an understanding of their mutual relations. By extracting relevant knowledge from a huge mass of information and structuralizing/visualizing it, the support of the creation of ideas becomes possible. As well, these tools also support smooth communication among different fields as a common language.

4) Social issues as an opportunity for innovation

In addition to the deep-rooted negative aspects of society such as discrimination, poverty, ethnic conflict, and environmental destruction, modern society is faced with issues including global warming, the decreasing birthrate, aging, and shortages of water and food. Not with traditional approaches to problem solving but by grasping these social issues as opportunities for innovation, we aim to see these issues solved as the result of innovation.

5) Provision of real experience

Providing opportunities for collaboration with corporations and authorities, we provide real experiences to interface with actual society. Real experience leads to the creation of ideas on a solid footing, and cultivates "feelings" which become the motive power that drives their realization.

Following is the content of the workshops.

Column: The mindset that leads to ideas

What influences abductive reasoning? The influences on thought which produces methods of achieving a certain goal can be said to be knowledge regarding the goal, knowledge regarding the methods, environment, physical condition, psychological condition and so on. That which is expressed by the words "mindset" or "worldview" seems also likely to play an important role.

Although everyone has the capacity to produce new ideas, why is that capacity often underutilised? Antonio R. Damasio's theory of somatic markers provides a hint. Damasio is an internationally leading figure in the field of modern neuroscience. Somatic means physical, and Damasio's argument is that human mental activity takes place not only in the brain but also involves a major role played by the body. For example, when you make a given decision, you unconsciously imagine various images relating to that decision. Each image calls up a certain change in your physical state, that is a sensation. Images which produce unpleasant sensations are unconsciously dropped from the choices, and those which relate to pleasant sensations emerge into your consciousness as possible results for the decision.

The connection of image and sensation is created through long experience. It doubtless depends greatly on what kind of society one was born and raised in, what kind of people one has lived with, what kind of experiences one has had. Most likely, the possibility is high that people who have grown up in Japanese society may associate new things with negative sensations. Perhaps the experiences of suggesting a new idea and having it denied, or trying out a new idea and failing, or the evaluation received at that time may be creating a negative sensation with regard to new things. Are we not unconsciously destroying the seeds of new ideas, although we have the capacity to create them, are even halfway to creating them? If we become consciously aware of them, we may be able to find the courage to propose them. However, when we unconsciously nip new ideas in the bud, it is not easy to draw these ideas out.

How can we nurture the capacity to create new ideas? First, it is important to go through the successful experience of coming up with a new idea, having it well evaluated by others, and feeling one's own sense of accomplishment. It is important to arrange for an environment where this kind of successful experience can take place, and it is also important to be aware of how the environment can be arranged and workshops promoted in order to make this successful experience possible. By savoring this successful experience and knowing how to recreate it, self-confidence in the creation of new ideas will grow. Thus, pleasant sensations will be caused by images related to new ideas, and new ideas will appear in one's consciousness.

(2) The innovation process

The process of innovation is divided into three steps.

1) Understanding

This step involves research, observation, and analysis of the phenomenon which is its object, getting closer to the actual nature of the task. In human-centered innovation, this step is the most important of all. In order to clarify the root cause of the issue and the fundamental values which people have not been aware of, it is essential to deepen human understanding.

2) Creating

This step involves creating new ideas of things or concepts in order to solve

problems and create innovative values. The most important way of thinking in this step is abductive reasoning. This includes using group work to develop an individual's idea into an even better one, or combining multiple ideas to make an entirely new one.

3) Realizing

This step involves turning a new idea into a realizable business plan, actually carrying out the plan, and changing society with it. How far to carry out innovation education depends on the principles of education, but in the workshops we go as far as the business plan, and for members to turn their business plans into actual businesses after the workshops are over is one realistic format.

In each workshop, working from these three processes, we sometimes focus on one part and construct the workshop process around it, and sometimes make all three steps part of the experience in order to have participants understand the entire process.

Next is the actual workshop content so far.

(3) Workshop history

Seventeen workshops have taken place in total between September of 2009 and December of 2011. They are listed in Chart 1.

Chart 1. Workshop history

	Theme	Facilitator	Schedule
09WS1	Better communication for working mothers and children	IDEO, d.school	5 full days
09WS2	Considering the future of India	Hakuhodo	3-hour sessions once a week for 4 weeks
09WS3	Building social enterprise	Horii*, Sumitani**	2 full Saturdays and 3 afternoons
09WS4	Designing eco-experience	Hitachi Design Hdqtrs.	3 several-hour sessions once a week and 1 full Saturday
10WS1	The future of domestic tourism	Hakuhodo	3-day retreat
10WS2	Building the future of newspapers	Tamura*	3-hour sessions once a

			week for 10 weeks
10WS3	Understanding and connecting with different cultures in neighboring countries	Tamura*, KAIST	8-day full day intensive (including retreat)
10WS4	Innovations in the "learning" environment of modern children	Ziba Design	5-day full day intensive
10WS5	The future of manufacturing	RCA	5-day full day intensive
10WS6	Sustainability design	Hitachi, Horii*, Sumitani**	3-hour sessions once a week for 11 weeks and 2 full Saturdays
11WS1	The future of agriculture in Japan	Hakuhodo	4-day retreat
11WS2	Games in the future	Tamura*	3-hour sessions once a week for 10 weeks and 1 full Sunday
11WS3	Supporting old people's trips outside	Tamura*, Yokota*, KAIST	7-day full day intensive
11WS4	Building future storefronts	Aalto Univ.	5-day full day intensive
11WS5	The future of cellular phones	Hamaguchi (Ziba Design)	3-day full day intensive
11WS6	The future of work	RCA	5-day full day intensive
11WS7	Service innovation in demand-side management	Horii*, Sumitani**	3-hour sessions once a week for 10 weeks and 1 full Saturday

*i.school, **LearnNet Global School

The themes are diverse, but clearly each has been chosen to relate intimately to people's lives. The time frames of each workshop also vary. Those held during term-time are usually three-hour sessions once a week for ten weeks. What part of the innovation process is being focused on also differs from workshop to workshop. Through experiencing diverse workshops, we aim to have students get a sense for the methodology of workshop process design.

Another part of i.school's attraction is the holding at Tokyo University of workshops successful all over the world in cultivating the capacity to create human-centered innovation. It is not only profitable for the participants, but for the i.school as well offers a chance to analyze these

workshops and learn from the goals and effects of the construction principles of their process and the factors included in the process.

(4) Proposals of new objectives and methods

Workshops are concerned with various themes, but have in common the goal of proposals of new objectives and methods. For example, in 09WS1, as a method of achieving the objective of deepening communication between working mothers and children, the task was to propose some kind of service or product. Chart 2 shows various workshop objectives and methods.

Chart 2. Objectives and methods

	Objectives	Methods
09WS1	Supporting communication between working mothers and children	Products/services
09WS3	Resolving social problems	Social enterprise
10WS1	Fulfilling needs of future domestic tourism	Domestic tourism business
10WS5	Fulfilling necessary functions and sustainability	Products

The central task for the creation of innovation is the proposal of objectives and methods. The way of thinking for this purpose is abductive reasoning, and the task is to think of a method for a given objective.

In order to create innovation, that is, new big things and ideas with impact, it is effective to think of a 2x2 combination as shown in Chart 3.

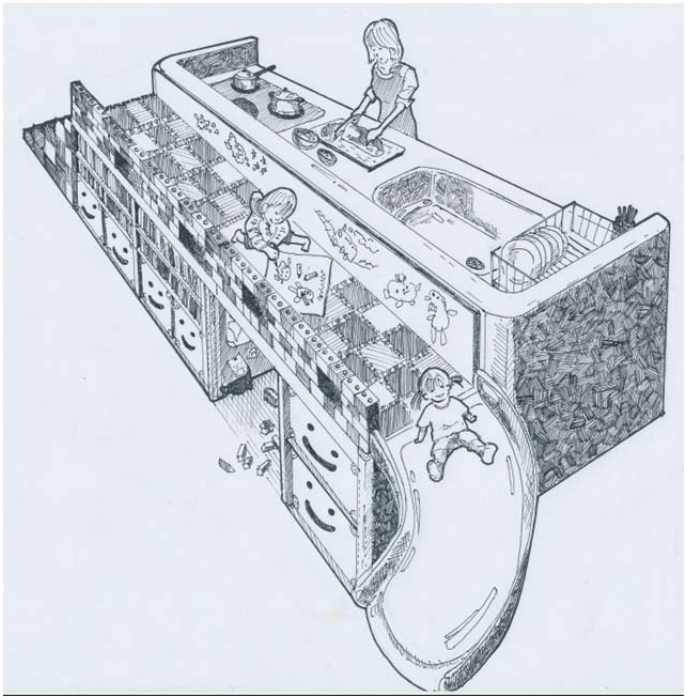
Chart 3. Analysis framework of innovation

	Novelty	Impact
Objective	A	B
Method	C	D

Let us consider the theme of workshop 09WS1, facilitated by IDEO. Working mothers want to spend as much time as possible with their children when they are at home. Even if they know they should not, they allow a situation like the one in Figure 1 to take place. From the small child's perspective, they always have to look up at the mother. What was thought of here (the writer's idea in 09WS1) was the idea, as in Figure 2 of a playground x kitchen = a play-kitchen. The playground's height is arranged so that the

child can meet his or her mother's eyes across the kitchen counter. The playground is a slide, which the child can slide down after climbing the stairs. Its base is a storage space for toys. Naturally, the design makes the child's safety the first priority.

Figure 1. A child looking up at his mother, spending as much time as she can with the child. (Illustrations by Arata Hayato)



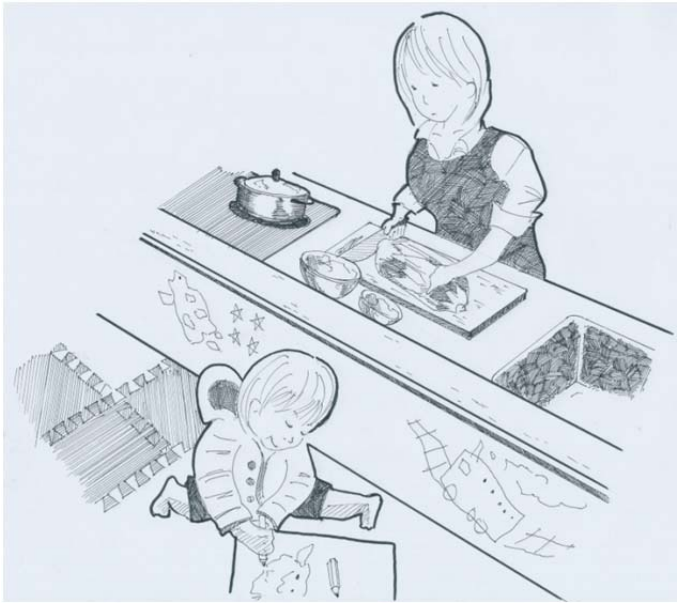


Figure 2. Mother and child dialogue in the play-kitchen

The objective of being able to play and have conversations while cooking may not be that new (chart 3A), but if, for the working mother, the time spent cooking becomes enjoyable dialogue time with the child, and for the child, time to feel the mother's presence, the impact of the objective is large (B). Novelty is recognized in the method of combining playground and kitchen (C). The impact created depends less on the function of the method (D) than on the objective carried out thereby (B).

Further explanation the analysis framework of innovation in Chart 3 follows, with a different example. Technocentric innovation, through dramatically advancing the functions of its methods by technological innovations, brings about novelty (C) and impact (D), and it is thought that people follow the objectives brought about by these methods.

The FeliCa card combines the good points of both human-centered innovation and technocentric innovation. Its objective, that of being able to get all services from payment to unlocking with a single thin, light card, is new (A) and has impact (B), and the objective is realized by the function of the method (C, D) of technology which runs on electricity from the electric waves put out by the reader.

(5) Finding the “objective”

What is necessary to cultivate the capacity to create innovation is first to cultivate the capacity to find a new “objective.” A new “objective” may be an issue to be resolved or a value to be realized, but the human-centered innovation which the i.school seeks is drawn from new “objectives” discovered by deeply looking into people’s lifestyles and values. People may not be able to answer when asked what they want, but when presented with something and asked “How about this?”, they answer “This is what I wanted” or “This is what I hoped to do”; objects and services which are linked to this kind of reaction are the purpose of human-centered innovation.

How can we discover new “objectives” which will connect to this kind of objects and services? In order to discover new “objectives” which will lead to human-centered innovation, it is necessary closely to examine human lifestyles and values, but as stated before, it is essential to live in the object for that purpose. Living in the object means becoming completely the person who is the object, feeling as they feel. Through living in the objects, the moment of the inspiration for a new “objective” which will lead to human-centered innovation will come. In English, this is called “insight.” Its meaning is not only “discernment” but also “inspiration” or “realization.”

The inspiration which leads to human-centered innovation is a mental process which occurs unconsciously, different from the process of logical thinking which leads to a conclusion. It is important to sharpen one’s senses and experience the same feelings as the person who is the object. Through living in the object, and thus building up experience of the moment when inspiration arrives, the capacity to find new “objectives” is cultivated.

The American design company IDEO introduced in chapter 1 has received much attention for its many innovations. IDEO promotes an approach to design called Design Thinking. In this approach, the design process begins with the task of how best to fulfill peoples’ Desirability through design, and through consideration of the design’s Feasibility from technological and organizational viewpoints and Viability in the financial aspect, the design comes to exist sustainably in society and fulfill its role. They use the phrase “thinking,” but “approach” seems the most suitable.

IDEO’s design process uses the investigative method of rapid ethnography on a small number of extreme users. An extreme user means someone outside the normal scope of objects, and in the sense of a product

user, someone whose usage rate is extremely low or high. Ethnography is a term from cultural anthropology and sociology, referring to the investigative and recording methods and records derived from fieldwork on the behaviors of a group of society. It is common to spend a long period of time living with the objects of the study. In research on product development and marketing, because the number of objects of research and the time for observation are both limited, rapid ethnography is called business ethnography.

(6) Thinking of methods

Having found a new "objective," the next thing is to think of the "method" to achieve that "objective." The thinking which produces "methods" to achieve the "objective" is abductive reasoning.

It's easy to think how a given "method" accomplishes its objective, but not so simple to come up with a "method" to accomplish a given "objective." If one knows all the existing "methods" and can find one to accomplish the "objective" among them there's no problem, but no one can know all the existing methods, and it seems unlikely that "methods" already exist for the new "objectives" discovered by deep observation of people's lifestyles and values.

Therefore, the task is to come up with newly effective "methods." In order to do that, knowledge regarding the "objective," the "method," and their interrelations is required. Without the knowledge of what kind of "method" will produce what kind of "objective," there is no way to think of a "method" to accomplish the given "objective." How to acquire the necessary knowledge depends on the "objective" and "method" in question. For knowledge regarding the necessary "method" to accomplish an "objective" in daily life, it may be sufficient to make good use of the knowledge built up in people's memories. When using cutting-edge scientific technology as the "method," not only knowledge of cutting-edge scientific technology but strategic knowledge of how to use it is also necessary. The ability to understand all this knowledge is also required.

There is a vast amount of knowledge concerning objectives and methods, and even when access to it is possible, use of it is not. The human memory is a fabulous mechanism. Necessary memories are unconsciously selected and conveniently combined and reconstructed in consciousness. Because this memory mechanism exists, it is possible to extract the

necessary knowledge from the past experiences and knowledge stored in the cerebral neocortex. However, this memory mechanism is not all-powerful. We cannot always produce the necessary memories. Whether the memory mechanism functions successfully or not depends on what opportunities it is given. As well, the memories in one person's brain alone are not sufficient. It is also important how external information is used.

Almost all knowledge regarding objectives and methods is area-specific. For example, the flight recorder in an airplane, called the black box, is a method to achieve the purpose of identifying the cause of flight accidents, but the knowledge of this "method" is limited to the area of flight. I have never heard of a "black box" being used outside of an airplane. However, through transferring the knowledge of a flight recorder to use in an automobile, the drive recorder was created. A drive recorder is a video camera fixed in a car which provides videos of an accident if one occurs. Because it clarifies what the cause of the accident was and who was responsible for it, it allows irrational assignation of responsibility to be avoided.

Reusing area-specific knowledge in another area in this way, that is the use of knowledge across areas, doubles the usefulness of knowledge and is an extremely effective method. Knowledge is built up within an area, requiring vast amounts of effort, but the knowledge thus formulated is hardly ever used outside of that area. It is clear that tremendous merits can derive from the use of this kind of knowledge outside its original area. When knowledge is used across areas, it is well known that it leads to innovative ideas. The reason interchange across areas is effective is because it leads to this kind of use of knowledge across areas. How to make this kind of cross-area knowledge use possible is a major issue.

The approach of supporting abductive thinking by making analogies work is one which underlies this entire book. This is a method of superordinating and analyzing the function of existing methods. In the example of the flight recorder and the drive recorder, if we superordinate the "objective" as "clarifying the cause which brought about a given result" and the "method" as "recording the information relating to a given result," the similarity of the two "methods" becomes obvious. Through consciously making use of this kind of practice, we can support the proposal of new and groundbreaking "methods."

Column: Modeling the objective-method relation

Made to Stick (Chip Heath and Dan Heath, 2008) describes the work of an Israeli research team, offering plentiful suggestions for designing innovation workshops.

In 1999, an Israeli research team assembled and analyzed 200 advertisements which had won or been finalists in first-rank advertising contests; they learned that 89% of them could be categorized into one of six categories. This suggested that by learning the six categories, one could make a high-quality advertisement. Further, analysis of 200 non-prizewinning advertisements showed that only 2% of them fell into the six categories.

Advertising novices were given background knowledge on shampoo, diet foods, and sneakers, and divided into three groups. The first group was told to begin production immediately, without any training. The second group was given two hours of training in the form of free association brainstorming before beginning production. The third group was given two hours of training on the six categories before beginning production.

15 ads each were chosen and shown to consumers. They judged those of the first group as "cluttered and annoying," and evaluated the second group's creativity similarly. The evaluations of the third group's creativity were some 50% higher than the other two, and the approval of their products also 55% higher.

From this example, we can say that advertisements are a method, and the objective which they accomplish is to raise approval towards their products. Analysis of existing high-quality advertisements means analyzing the method and gaining knowledge of it. And the six categories are none other than modeling the objective-method relations.

In order to create a high-quality method, knowledge of methods is necessary. One must also pull that knowledge together into usable form. In order to come up with methods for creating novelty and impact, it is effective to prepare a usable form of knowledge regarding the methods. There is a limit to the knowledge of methods gained from experience. In particular, when dealing with unfamiliar methods, one must efficiently acquire knowledge on how to use them.

(7) Mechanisms which create novelty

New ideas are sought after in all the i.school's workshops. The mechanism of thinking of ideas while developing people's capacity to create new ideas, listening in group work to other people's ideas, trying to answer questions and to explain to other people, is used in all the workshops.

Through research of the workshops held at the i.school, it has been possible to confirm the mechanism strategically implanted therein which creates novelty, separate from the basic commonalities. The following eight different mechanisms have been confirmed.

1) Understanding others: 09WS1, 10WS2, 10WS3, 10WS4, 11WS2, 11WS6

Through ethnography, human understanding is deepening and new realizations and discoveries are gained; this is the mechanism of finding new "objectives." When new "objectives" are found, new "methods" to realize them are created.

2) Observing the future: 09WS2, 10WS1, 11WS1

The daily life and society of the future naturally involves novelty. When we think of the future, it leads to thinking of new objectives and new methods. The problem is in how we think about the future. The workshops used the scanning technique for examination of the future.

3) Clarifying concepts: 09WS4, 10WS6

For example, there are many experiences which we think of as ecological, and "eco" is a broad concept. By making a list of experiences which seem ecological and categorizing them, we can define the concept of "eco" more precisely. By clarifying concepts in this way, we can find the real "objective" which had not been getting enough attention.

4) Shifting thought patterns: 10WS4, 11WS5

By analyzing the thought patterns of people thinking about new "methods" and shifting them in different directions, we can come up with unconsidered, brand-new "methods."

5) Shifting value standards: 10WS5, 11WS7

This will be explained in more detail below.

6) Finding new combinations: 09WS3, 10WS6, 11WS7

This aims at the method of supporting abductive reasoning through analogy, as described in this book. Using superordinated method-objective relations, new methods are created by finding objective-method combinations and combining different methods.

7) Discovering objectives from unexpected ways of use: 11WS3

We consider a different "objective" from the originally posited one with regard to a given "method." Among the "objectives" thought of in this way may be some which until now had no appropriate "methods." Through this kind of approach, there is a possibility of arriving at human realities and new "objectives" which until now have not been focused on.

8) Going back to square one: 11WS6, 11WS7

After pulling out ideas, through the process of choosing, developing and combining ideas, we sometimes throw out all the work and start from scratch; we call this going back to square one. Starting fresh from scratch is often considered to mean that the work until then was a failure. By consciously suggesting the possibility of going back to square one, we can lighten the psychological burden attached thereto. Thinking back to square one does not mean the work until then was wasted. By becoming aware again of the external conditions under discussion and the value standards to be taken seriously, recomprehending the learned process until then, and repeating it under a correct understanding, meta-thought about thought comes to function. As a result, the probability of the creation of new ideas increases, and the educational effect of the workshop doubles.

Here 5), shifting value standards, will be explained in a little more detail. In the RCA workshop 10WS5, "The future of manufacturing," each group was given a refrigerator, a vacuum cleaner, a hairdryer, a printer, and a CD player and told to disassemble them. After laying all the parts out clearly for display, they were told to explain the function of each part.

Next, there was a lecture on sustainability, and we asked whether each industrial part was acceptable from the point of view of sustainability. Further, we directed them to imagine a part which would perform the same

function but have better sustainability.

For example, in order to dry your hair, there is no need to use electricity to create a hot blast of air. As water-absorbant material has been developed, why not use a water-absorbant towel? By thinking in this way, ideas for new products are created.

We know the value of sustainability as a word, but by internalizing it and making it our own, new ideas are created. This is the mechanism of "shifting value standards." In order to internalize the value of sustainability, we had the students experience a long time spent disassembling the products and displaying their parts.

This mechanism was also used in 11WS7. This workshop will be introduced in chapter 4 as a specific example of the i.school's workshops. Before that comes a discussion of the modeling of the workshop process.

3. The workshop process

"Workshop" originally meant a workplace, but it has come to mean a participatory, both-directional group experience activity, held in a variety of fields including education, training, arts, and community-building. Its focus may be on educational effect or on consciousness-raising or output.

In a workshop, information from outside is input, information processing takes place internally, and a final output emerges. At the i.school workshops, "methods" are the output, and the standards they must fulfill are "novelty" and "impact." With the goal of creating new methods to create new impact, information processing takes place.

What kind of information is input from the outside with what timing, what kind of information processing takes place in what way based thereon—these constitute the workshop process. Designing the workshop process is itself a creative activity, and it is appropriate to consider the designed workshop process a work in itself.

The workshop process can be experienced by the participants through the work of taking part, but it is important to record this and make it formalized knowledge. Further, the recording method of the workshop must be standardized and modeled to some degree. This leads to passing on, evaluating, and improving the workshop process.

Clarifying what kind of process is desirable in what situation and what kind of effects can be expected from each process is to construct the

methodology of design of the workshop process. To scientize the workshop process means to construct such a methodology. In order to construct the methodology and justify its appropriateness, the use of knowledge and methods from consciousness science and organizational behavior studies is effective.

Below the modeling of the workshop process will be discussed, with a focus on raising ideas.

(1) Modeling the workshop process

As stated in section (6) of chapter 2, new ideas, that is, thinking which produces methods of achieving objectives, a form of inference called abductive reasoning, are the most basic element in a workshop that produces innovation. Abductive reasoning is categorized into 1) that which is consciously carried out as raising ideas during work time, 2) that which is carried out unconsciously while being stimulated during group work by others' ideas, statements and questions, or by asking and answering questions with others, and 3) that which is consciously or unconsciously carried out outside the workshop's work time.

Thinking from the workshop's objective of deliberately creating new ideas, the raising of ideas in part 1) is located as a central construction element in the workshop. As well, the ideas thus raised often become not only material for the work in the group work thereafter but also the basis for the abductive reasoning during the group work as in 2).

The quantity and quality of the ideas thus raised control the quality of the workshop's final output. In an innovation workshop, the three important points are 1) what happens before raising ideas, 2) how ideas are raised, and 3) what work is done using the ideas that have been raised.

In this way, we can model the basic structure of the workshop as in Figure 3. In short, an innovation workshop is centered around raising ideas, and divided into the before and after of that process.

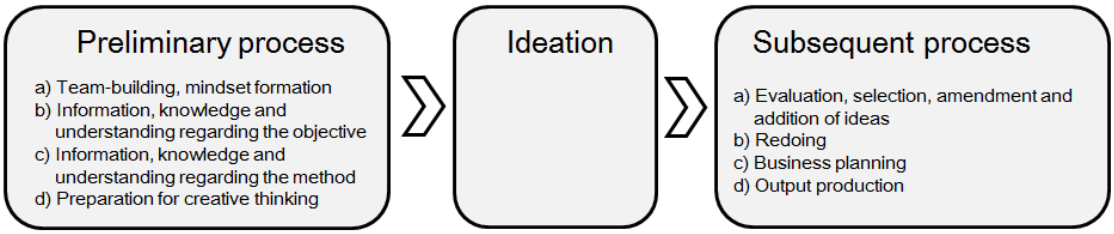

Preliminary process
a) Team-building, mindset formation
b) Information, knowledge and understanding regarding the objective
c) Information, knowledge and understanding regarding the method
d) Preparation for creative thinking
Ideation
Subsequent process
a) Evaluation, selection, amendment and addition of ideas
b) Redoing
c) Business planning
d) Output production

Figure 3. Modeling the workshop process

Below, let us look at the content of activities in the processes before, after, and during the raising of ideas.

(2) Preliminary process

In order to heighten the quality of thought when raising ideas, the conditions for idea-raising are important. Information and knowledge regarding the theme of the workshop are probably also stored in the participants' cerebral neocortices, but in the usual situation of the innovation workshop, the participants are not specialists in the theme given. Even if they have some experience or learning regarding the theme, it is effective for them to call up their previous memories during the preliminary process in order to make use of long past long-term memories in the workshop.

The following activities are organized during the preliminary process.

a) Team-building, mindset formation
b) Information, knowledge and understanding regarding the objective
c) Information, knowledge and understanding regarding the method
d) Preparation for creative thinking

Group work is often central to an innovation workshop. For the significance of group work, please refer to the column on "Knowledge Structuring." To make group work function effectively, the feelings and stances of the group members are important, and the team-building often carried out at the beginning of group work plays an essential role in building team atmosphere, trust among members, and a sense of comradeship.

Activities relating to information, knowledge, and understanding regarding the objective are part of the essence of human-centered innovation created through observing human lives and values, and can form a central

part of the workshop. How to gather information and knowledge, process it, and connect it to new understanding is a major task, and the construction of its methodology can be said to be an important issue for innovation workshops.

For example, in the workshops where the theme was social enterprise as a solution for social problems, in order to accomplish information and knowledge gathering and understanding with regard to social issues, a list of social issues was made and research on each issue was carried out. In many cases, fieldwork involving going into the field and carrying out interviews and observation is also effective.

In existing workshops, it is rare for the focus to be placed on information, knowledge, and understanding regarding methods. Workshops led by the author (09WS3, 10WS6, 11WS7) covered this territory.

When making comparisons with the constructive process of solutions to social issues which is the subject of this book, the problem analysis process to be compared is the activity which supports planning solutions: that is b) information, knowledge and understanding regarding the objective, and c) information, knowledge and understanding regarding the method. Methods in order to analyze existing solutions, use analogies, and propose new and effective solutions are also effective in innovation workshops. A specific example is introduced in chapter 4.

Preparation for creative thinking is done just before raising ideas, and is an activity arranged to create the most appropriate state of mind for abductive reasoning. For example, in the RCA workshop 10WS5, a free-association game was played just before raising ideas. Each group was given a roll of butcher paper. First they wrote the group's theme, then the first person wrote a word they associated with the theme and folded the paper to hide the previous content. The next person saw only the word written by the person immediately before them and wrote a word with which they associated it. After repetition, the game was changed to drawing pictures of images associated with the previous one. After repeating this several times, the paper was opened out and the string of pictures and words were considered. This was the warming-up activity RCA had prepared. Done before raising ideas and abductive reasoning, it can be understood as training in free association, instinctive rather than logical/verbal thinking, and imagination.

(3) Ideation

Experientially, it has been found that in ideation, it is effective a) to use individual work, b) to think of objectives and methods together to some extent, c) to imagine psychological images related to the ideas to be created, d) to clarify one's own questions.

The point of a) individual work derives its effect from drawing a line between this process and the group work until now, forbidding conversation with others and enforcing concentration on individual thought. When talking or reading, we search long-term memory based on once learned knowledge or episodes in order to understand words and phrases. Working memory (a form of memory in which information is temporarily maintained and used for high-level cognitive activity) plays a large part in linguistic activity, the core of cognitive activity, and if working memory does not work well, it is known that neither conversation nor reading will be successful. Because working memory also plays a major role in abductive reasoning, individual work is thought to be effective for raising ideas.

Let me explain regarding b) thinking of objectives and methods together to some extent. As discussed in part 4) of chapter 2, the workshop's task is to suggest new methods, but it is also called upon to set its own objectives for those methods to accomplish. For example, if the theme is to suggest social enterprises which will accomplish solutions to social issues, the objective is the resolution of social issues, and the method is social enterprise. First the social issue to be resolved must be identified, and next the social enterprise which is to resolve it must be considered: this seems to be an appropriate process, but it is often easier to come up with ideas by thinking about social issues and social enterprise at the same time. Even if the setting involves thinking of social issues first, there is a tendency to come up with social enterprise first. In many cases, that means thinking of more original social issues. From this experience, we encourage students to think of objectives and methods together to some extent.

When c) thinking of mental images related to the ideas to be created, ideas are often imagined. Rather than depending on language, imagining a situation without using language is appropriate to the creation of ideas. Imagining the situation when the method one is trying to think of would be applied, and putting oneself in that place, ideas naturally well up.

As for d) clarifying one's own questions, it prevents losing sight of what one is trying to think of. The brain seems as if it were made for giving back an answer to the question it is presented with, and thought begins when given the question, the work of finding an answer proceeding without resort to language. Therefore, in order to control thought in response to questions, it is effective to clarify one's questions.

(4) Subsequent process

The process which follows the bringing out of ideas is diverse, and combines various subprocesses according to the purpose of the workshop and the nature of its theme. Major subprocesses can be organized as follows.

1) Evaluation, selection, amendment and addition of ideas raised

Many ideas come to exist during the idea-raising process. Based on these, the task is to choose and pull together a single idea per group. There are various ways of thinking regarding this part, each with a different process appertaining.

If we consider that the process is not finished when an idea has been suggested, but that it is important to realize it, then the goal is for all the group members to feel they want to realize that idea. The task is to cultivate the awareness that it is not an individual's idea but the group's. Among multiple ideas, it is possible to choose one to be realized by vote, but it is difficult for this method to bring about this kind of awareness. It may be close to the concept of consent formation, but the awareness to be formed may not be best expressed by the word consent.

In Decision Making by the Individual and the Group: Human Information Processing and Judgment Heuristics, Ueda writes that "group decision making does not invariably supersede individual decision making, and the actual capacity of the decision-making group = the combined capacity of the group members + the mutual effect gain – the mutual effect loss." Imagining the choices in decision making is similar to imagining ideas in innovation. The possibility of a mutual effect loss in the form of the collapse of a group deriving from a clash of opinions has frequently been pointed out.

As examples of mutual effect gain, Ueda offers the increase of learning capacity of the group members due to observation learning and the

promotion of social ability, the generation of new ideas, and the cognitive stimulation which comes from the combination of ideas. Communication between group members with different worldviews creates the growth of a certain kind of crisis consciousness, and as a mechanism for its removal, it becomes possible to continue information activities which lead to the sublation of world views. The crisis consciousness regarding lack of acceptance of individual awareness and that, as a group member, regarding the division of the group work here. Crisis consciousness becomes the motive power for group members to continue their efforts to find and reinterpret information. This sublation mechanism itself is the significance of group work.

In Methods of Thought Guidance in Arithmetic and Mathematics Education, Shimizu discusses the meaning of pair work for the generation of meta-thought in the context of problem solving and the role of dialogue seen in the problem-solving process of pair work. Communication in group work promotes meta-thought, thought about thought, and it is suggested that this leads to the educational effect of developing the capacity to design the workshop process.

In "Integrative Thinking," Roger Martin argues for the importance of of creating creative solutions from contradictions and oppositions: that is, not making a simple choice of "A or B" but taking two opposing thoughts and lining them up, comparing them, looking for the good in both of them and finding an original answer. This kind of integrative thought is called for in this phase.

2) Redoing

As described in part 8) of section (7), chapter 2, it is effective deliberately to go back to square one. Definitively reconfirming that an idea meets the standards and evaluating all the ideas discussed so far can lead to new realizations and innovative ideas. As well, it also leads to formation of the awareness of a group idea discussed above.

3) Business planning

When the idea is settled, the next step is to move on to a business plan in order to realize it. Various works have already been published on this topic, and no particular additions are necessary here.

4) Output production

The final output of the workshop is passed on to others in the form of a presentation. Preparing materials and data for a business plan is also important, but I want to focus on aiming at a presentation which will posit business partners and service users and resonate with them. At i.school we often include skits in the presentation. This is also a process of giving shape to the developed group awareness, and also leads to expressing the characteristics of human-centered innovation and confirming its effectiveness.

4. Workshop example

Here we will look at an example of the i.school workshops, taking up 11WS7, "Demand-side management," which was held between October and December of 2011. There were 24 participants, divided into four teams. Year-long participants (those given permission to take part in all workshops for a year) numbered ten, and those who had applied only for this workshop eight. Participants from outside the university were six. There were four women, nine undergraduates, eleven STEM students, and seven humanities students.

The workshop was held for three hours once a week over ten weeks, plus one full Saturday. It was divided into two sessions, with a midterm presentation at the end of the first session and a final presentation at the end of the second session. Actual activity took place during the six weekly meetings and one Saturday in the first session and the two weekly meetings in the second session. The author led the first session, and the second was led by Sumitani Toshiki of LearnNet Global School. The discussion here begins with the first session.

(1) Summary of the workshop (first session)

To propose an entirely new service business within the context of demand-side management (DSM)

When supply is not keeping up with demand, supply-side management (SSM) responds by increasing supply. When supply cannot or should not be increased, the response is to control demand. This is demand-side management.

Demand-side management is divided into the situation in which, through equalizing demand chronologically or spatially, limited supply is used efficiently, and that in which demand is restrained. These situations may offer opportunities for new service businesses. This theme was selected based on the energy problems subsequent to the Great East Japan Earthquake, but its objects included not only energy but all situations in which supply is insufficient.

Method: Service business

The task of the innovation workshop is to propose new methods for creating novelty and impact, but this workshop's method is through service business.

Objective: To provide the value called for while effectively using limited supply and restraining demand.

The objective to be fulfilled by the method of the service business is to provide some value while effectively using limited supply and restraining demand. By providing some kind of value, the business establishes itself, service is provided and as a result the situation of unfulfilled demand is improved.

Mechanisms for novelty: New combinations, going back to square one, value shift (from SSM to DSM)

Three mechanisms are included. They are as explained in section (7) of chapter 2, but let me add an explanation on value shift here. In a success-oriented society, SSM is the normal procedure. Unfulfilled demand is a business chance, and increasing demand is the basics of business. DSM is understood on a theoretical basis, but not internalized. There is a need to overturn common sense. By "returning to square one," we included the experience of thoroughly discussing the principle of DSM.

Preliminary task: List high-quality services

Using High Service Japan 300 (an advanced project which aids in the improvement of production and the innovations praised by the Service Industry Production Association) as a reference, students chose ten high-quality services and uploaded them into a common evernote (a web

service which allows information storage) notebook. APISNote, a tool for structuring knowledge, would be used later; it has a data sharing function with evernote, so that data input into evernote can be used in APISNote as well.

Preliminary process: Team-building, mindset

A card game was played which had been constructed on the basis of "technology for laughs," a structured "technology" made as an application of a detailed analysis of situations which make people laugh. The purpose was to understand the system through which new ideas are thought of by using analogies; it was effective in experiencing the pleasure of creation and in unifying group consciousness.

Preliminary process: Information, knowledge, and understanding regarding the method

Existing services were analyzed, the results categorized, and superordination took place. Regarding each service listed in the preliminary task, 1) their high-quality service points and 2) the value-creation mechanism they use to achieve that quality were extracted, and input into APISNote.

For example, the high-quality service of Food Revolution Kura Corporation (Kura Sushi) is "1) the desired varieties of sushi come around in the right quantities and timing," and its value-creation mechanism includes "2) the disposal management system using an IC chip on the base of each plate" and "2) analysis and database creation of consumer records, leading to a demand foreseeing system."

Amazon's high-quality service point, "1) introducing books that suit the customer's tastes," is similar to that of Kura Sushi. These are superordinated as "tailor-made suggestions."

When these analysis results are input into APISNote, they appear as in Figure 4. With the use of APISNote, services similar to Kura Sushi can be searched for, and we can find out what mechanism each service uses for value creation.

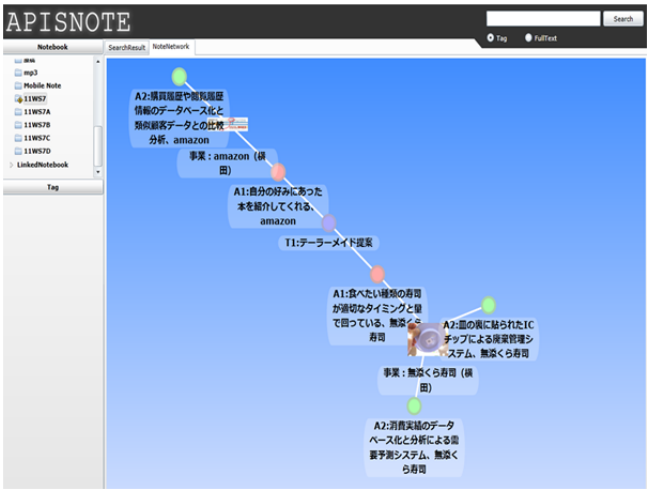


Figure 4. APISNote display screen

Other services were similarly analyzed, and categorical organization and superordination were carried out, the results being input into APISNote. This work itself is training for coming up with ideas using analogies.

Preliminary process: Information, knowledge, and understanding regarding the objective

Fieldwork took place to gather examples of DSM, and photographs and examples were input into evernote. Students investigated areas where DSM is necessary and examples of DSM functioning.

Preliminary process: Preparations for creative thought

This workshop did not do anything in particular here, but options might include the card game played at the team-building stage, or a card game using the information prepared during the preliminary process

Ideation (abductive reasoning)

Ten minutes of individual work were assigned. The question “What new services can exist in the context of DSM?” was written beforehand on a blue sticky note, and ideas and drawings for new services were written on yellow sticky notes.

While raising ideas, the DSM fieldwork and the good points of high-quality services were displayed on a screen as in Figure 5.

Figure 5. DSM investigation results and good points of high-quality services

Subsequent process: idea evaluation

After raising ideas, first they were shared and commented upon. Each idea was presented in order, and other group members commented on it. The day ended after going around several times. The ideas on sticky notes were input into APISNote, with information links added to the existing good points of services and so on. By the next meeting a week later, each member had chosen and amended ideas to bring in.

The following week, each person chose their best idea on grounds of a) novelty, b) size of impact created, c) viability, d) applicability to DSM, and wrote it on a blue sticky note. These were presented within the group, and other members wrote the good points of that idea on yellow sticky notes and posted them nearby (Figure 6).

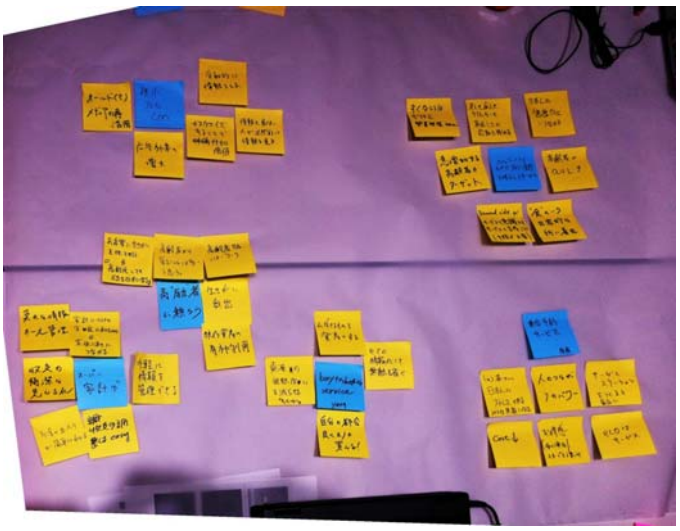


Figure 6. Service ideas and their good points

Next, the yellow sticky notes were gathered and organized by the K-J method, with similar good points given titles, and superordination took place. The titles were written on pink sticky notes. The blue sticky notes with service ideas were placed on the left and the pink notes with good points of service at the top, creating an idea matrix as in Figure 7 for evaluation of how and whether each service idea applied to each service point.

Figure 7. Idea matrix

Looking at the idea matrix in Figure 7, students chose two characteristic good points of service and created an idea diagram as in Figure 8. All the ideas were placed within this space. Rather than choosing one idea, the aim was to combine the good points of various ideas, as derived

from different evaluative axes, to create a new idea.

Through this kind of process, new ideas may also be created, but the purpose is not necessarily the creation of new ideas alone. It is important to raise awareness of evaluative axes and find new realizations and directions for discussion. More than anything else, it is essential to move away from clinging to one's own idea and develop awareness of cooperating to build an idea as a group.

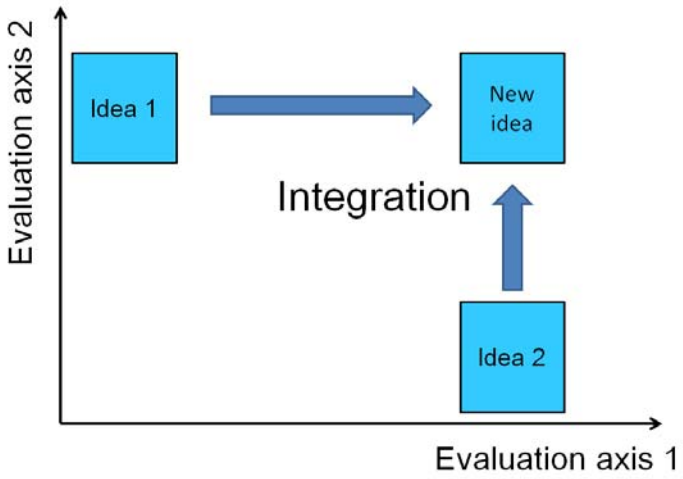


Figure 8. Idea diagram

Subsequent process: Back to square one

Next, we encouraged the students to return deliberately to square one and do the whole thing again. At this time, we directed that they consider once more the idea evaluation standards of a) novelty, b) size of impact created, c) viability, and d) applicability to DSM. Progress after this was left to each group.

Mid-term output

Using the full Saturday, each group prepared for their midterm presentation. Group A targeted traffic jams on long-distance highways. Group B took up the issue of concentration of patients in large hospitals. Group C dealt with the issue of not having enough time. Group D took up the issue of applications for employment being concentrated at certain popular companies. In the case of each group, supply (long-distance highway capacity, trustworthy medical service, time, employment at popular companies) was insufficient compared to demand, and in each case it was more appropriate to control demand than to increase supply, so that, after discussion, all were

judged to meet condition d) of applicability to DSM.

Due to considerations of length, it is not possible to describe the process in more detail, but I will next explain how Group C produced its idea.

Column: Knowledge structuring

The i.school is managed as an educational project of the Tokyo University Center for Knowledge Structuring, of which the author is the director. This is because the structuring of knowledge is considered an essential part of the creation of innovation. The Center for Knowledge Structuring aims to develop the knowledge structuring tools used in the i.school workshops, and to prove that the structuring of knowledge is indeed an essential part of the creation of innovation.

At the Center for Knowledge Structuring, the vast quantity of knowledge built up daily is, through various structuring techniques, developed through various methodologies intended to be useful for intellectual discovery and innovation, problem-solving, decision-making, and human resource cultivation; research and development continues with the aim of implementing the results thereof in society. "Knowledge structuring" means using computers to process large amounts of information, clarifying the relations among the elements, and making all usable. Through this process, large amounts of information become usable for various purposes. Search engines are the most common method of using large amounts of information. Search engines select the necessary information from large amounts of informations, but they are not the only method of supporting intellectual activity. Techniques of knowledge structuring do not only provide information but also show the relations among different pieces of information, thus being able to support a grasp of the whole image of information, a structural understanding of knowledge, and intellectual discovery and the creation of ideas. For this purpose, the Center for Knowledge Structuring uses cutting-edge technologies of natural language processing, artificial intelligence, and web engineering, "knowledge structuring technology," for its research and development into methodologies that can be of use.

In the i.school workshops, the task is to create a "method" to achieve a given "objective." For example, when the "objective" is a solution to a social issue, the task is to create a "method" in the form of social enterprise. In the

workshops, specifying a given "objective" to be worked on from a large volume of information about the "objective" and using information relating to the objective and the method is necessary to come up with a new "method." Group work is central to the process. Structuring the many opinions which the members produce and making them visible creates new ideas and plays an essential role in consent formation.

In order to carry out this kind of work efficiently, we have developed tools based on the knowledge structuring technology APISNote, developed by Professor Nakayama Kotaro. Through APISNote, information on the "objective," the "method," their relations, observed facts, interpretation of the facts, ideas deriving from the interpretation, and ideas regarding the "method," and the relations among all this information can be made visible.

Compared to work done with sticky notes in the past, the proven merits are that it is possible to process larger amounts of information, to analyze in more detail the relations among information, to record and recreate the work process, to do decentralized processing for group work, and so on. Considering the workshops as a mechanism for inputting group knowledge and an opportunity to use that knowledge, we hope to use effectively the discussion results of past workshops to create new knowledge and use it in future workshops. APISNote plays a major role here.

(2) The thought process of idea creation

The six members of Group C were Fujita Takahiro (a second-year masters' student in engineering), Yamazaki Yosuke (a senior in the humanities department), Yang Jiayu (an exchange student and a first-year doctoral student in agricultural bioscience), Kishi Hirotoshi (a second-year doctoral student in engineering), Sunahata Hisanori (a professional working in management and planning), and Suzuki Akitoshi (a professional working in research management).

This group finally proposed the service of "looking back at your past time and objectively reappraising it in order to consider how you spend time in the future," and are continuing to work to realize this service even after the workshop has ended.

Here the development of the idea will be clarified, following the thought process of Kishi Hirotoshi, the original presenter of the idea.

One of the ideas presented in the raising of ideas held in week 4 was

a “super household account book.” Through single-dimensional management of credit, cash, bank deposits and transfers, thus allowing the user to grasp their own financial status appropriately, this service would make it possible to control consumption (demand management). Let us first look at how this idea came to be.

Ten minutes of ideation: the idea of the “super household account book”
Background: Regarding the definition of DSM, understanding had considerably deepened through the analysis of services up until then.
Question: Bearing in mind the issues of “What does DSM mean?” “Something with a more influential impact.”
Opportunity: Worrying about simply not having any money.
Thought process: Something influential would be good □ what would get everyone’s attention □ think about something more influential □ something everyone uses □ management of expenses

In week 5 ideas were evaluated, there was a “return to square one,” and that Saturday was spent entirely on group work.

Before group work began
Opportunity: Because a number of people were late to the morning gathering, there was conversation about time.
Thought process: “Can’t use time well” is an interesting way to look at it → “time” is demand side management too → some kind of time-related service?

Group work: work-life management
Background: Good understanding of supply and demand. Starting from the “super household account book” idea, had an idea of “single-dimensionizing information.” Went back and thought about the basics of DSM, to wit “by organizing demand within limited supply, it can be used effectively.”
Question: “What do I want to resolve? What would it be good to have?”
Thought process: Going off track repeatedly about water and time, the story of the iPhone sleep cycle alarm app which wakes you up in the morning → talking about water and wondering what interesting things could be done with “time” → having just bought a dayplanner, “Noguchi Yukio’s

Super-Organized Dayplanner" → could a "schedule" be done with DSM? □ if you could manage time effectively with single-dimensional management of scheduling, wouldn't that be a good service? → not a "super household account book" but a "super dayplanner"

In this way, the idea of work-life management was born, and the service of a life concierge was suggested at the midterm presentation. Through interview research and group work, the final proposal was developed and named MOMO 2.0.

This could be called an idea derived from the analogy of the super household account book and the super dayplanner, by switching money and time, but more than consciously using analogies, it is perhaps closer to say that analogies functioned unconsciously. Because training using analogies had taken place, we can think that analogies functioned in this way, but in order to confirm this further research is needed.

5. Directions for the development of innovation education

This article has introduced i.school, the University of Tokyo, the modeling of the workshop process, and an example of the workshops. Regarding the creation of new methods, there is a commonality with the proposal of new solutions for social issues and of new products, services, and businesses. The success of the i.school can also be put to use in the proposal of solutions for social issues. There should be some value in coming up with proposals of solutions for social issues in the workshop format and designing that workshop process.

As well as heightening the quality of the i.school workshops and improving their educational effects, in order to raise the probability of the creation of innovation, it is important to refine the methodology of the workshop process: that is, to be able to determine what kind of workshop process is appropriate for what kind of task, and further, to be able to explain why. For that purpose, the i.school workshops must be the focus of research, and the results of that research must be reflected in the design of the workshop process. I would like to call research into innovation workshops innovation science. For the development of innovation education, it is important that innovation science become an academic field.